

**AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the present application.

**Listing of Claims:**

1. **(Previously Presented)** A process of producing a pulp sheet, said process comprising:  
adding a paper quality improver for papermaking to pulp in any step before a papermaking step of forming a paper layer while water in a dilute solution of a pulp material is filtered through a wire while moving thereon;

wherein the paper quality improver for papermaking comprises:

a copolymer (A) having a constituent unit derived from at least one nonionic monomer having a solubility parameter of  $20.5 \text{ (MPa)}^{1/2}$  or less and a constituent unit derived from at least one anionic or cationic monomer, and

a surfactant (B) at an (A)/(B) ratio in the range of 85/15 to 15/85 (weight ratio),

wherein a mixture of the copolymer (A) and the surfactant (B) is prepared by adding surfactant (B) to an aqueous solution of copolymer (A),

wherein the paper quality improver provides at least one paper quality improving effect of the followings (i), (ii), and (iii):

(i) standard improved bulky value:  $0.02 \text{ g/cm}^3$  or more;

(ii) standard improved opacity: 1.0 point or more; and

(iii) standard improved brightness: 0.5 point or more;

wherein the copolymer (A) further comprises a constituent unit derived from at least one nonionic unsaturated monomer having a solubility parameter of  $26.6 \text{ (MPa)}^{1/2}$  or more; and

wherein, as the contents of the constituent monomers, the copolymer (A) comprises:

5 to 84% by weight of the nonionic monomer having a solubility parameter of  $20.5 \text{ (MPa)}^{1/2}$  or less,

1 to 80% by weight in total of the anionic monomer or the cationic monomer, and

15 to 94% by weight of the nonionic unsaturated monomer having a solubility parameter of  $26.6 \text{ (MPa)}^{1/2}$  or more;

wherein the surfactant (B) is a water-soluble alcohol alkylene oxide adduct containing an alkylene oxide group having 2 to 4 carbons in an average amount of 5 to less than 150 moles per 1 mole of the alcohol; and

wherein the paper quality improver provides a paper quality improving effect of a standard improved ratio in burst index of -502 or more.

2. **(Previously Presented)** A process of producing a pulp sheet, said process comprising:

adding a paper quality improver for papermaking to pulp in any step before a papermaking step of forming a paper layer while water in a dilute solution of a pulp material is filtered through a wire while moving thereon;

wherein the paper quality improver for papermaking comprises:

a copolymer (A) having a constituent unit derived from at least one nonionic unsaturated monomer having a solubility parameter of  $20.5 \text{ (MPa)}^{1/2}$  or less and a constituent unit derived from at least one anionic or cationic monomer, and

a surfactant (B) at a rate in the range of (A)/(B) of 85/15 to 15/85 (weight ratio),  
wherein a mixture of the copolymer (A) and the surfactant (B) is prepared by  
adding surfactant (B) to an aqueous solution of copolymer (A),  
wherein the paper quality improver provides at least one paper quality improving effect  
of the followings (i), (ii), and (iii):

(i) standard improved bulky value:  $0.02 \text{ g/cm}^3$  or more;

(ii) standard improved opacity: 1.0 point or more; and

(iii) standard improved brightness: 0.5 point or more;

wherein the copolymer (A) further comprises a constituent unit derived from at least one  
nonionic unsaturated monomer having a solubility parameter of  $26.6 \text{ (MPa)}^{1/2}$  or more; and

wherein, as the contents of the constituent monomers, the copolymer (A) comprises:

5 to 84% by weight of the nonionic unsaturated monomer having a solubility parameter  
of  $20.5 \text{ (MPa)}^{1/2}$  or less,

1 to 80% by weight in total of the anionic monomer or the cationic monomer, and

15 to 94% by weight of the nonionic unsaturated monomer having a solubility parameter  
of  $26.6 \text{ (MPa)}^{1/2}$  or more;

wherein the surfactant (B) is a water-soluble alcohol alkylene oxide adduct containing an  
alkylene oxide group having 2 to 4 carbons in an average amount of 5 to less than 150 moles per  
1 mole of the alcohol; and

wherein the paper quality improver provides a paper quality improving effect of a  
standard improved ratio in burst index of  $-502$  or more.

3-5. (Canceled)

6. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein one of the constituent monomers of copolymer (A) further comprises a crosslinkable constituent monomer.

7. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein the HLB of the surfactant (B) is in the range of -5 to 15.

8-10. (Canceled)

11. (Previously Presented) A process of producing a pulp sheet according to claim 1, further comprising a water-soluble polymer (C) having at least one of a weight-average molecular weight of 1000 to 10,000,000 and a viscosity at 25°C in an 1% aqueous solution of 1 to 4,000 mPa.s.

12. (Canceled)

13. (Previously Presented) A process of producing a pulp sheet according to claim 1, comprising the step of papermaking the pulp at a papermaking speed of 200 m/min or more.

14. (Previously Presented) A pulp sheet which is obtained by adding a paper quality improver for papermaking to pulp in any step before a papermaking step of forming a paper layer while water in a dilute solution of a pulp material is filtered through a wire while moving thereon;

wherein the paper quality improver for papermaking comprises:

a copolymer (A) having a constituent unit derived from at least one nonionic monomer having a solubility parameter of  $20.5 \text{ (MPa)}^{1/2}$  or less and a constituent unit derived from at least one anionic or cationic monomer, and

a surfactant (B) at an (A)/(B) ratio in the range of 85/15 to 15/85 (weight ratio),

wherein a mixture of the copolymer (A) and the surfactant (B) is prepared by adding surfactant (B) to an aqueous solution of copolymer (A);

wherein the paper quality improver provides at least one paper quality improving effect of the followings (i), (ii), and (iii):

(i) standard improved bulky value:  $0.02 \text{ g/cm}^3$  or more;

(ii) standard improved opacity: 1.0 point or more; and

(iii) standard improved brightness: 0.5 point or more;

wherein the copolymer (A) further comprises a constituent unit derived from at least one nonionic unsaturated monomer having a solubility parameter of  $26.6 \text{ (MPa)}^{1/2}$  or more; and

wherein, as the contents of the constituent monomers, the copolymer (A) comprises:

5 to 84% by weight of the nonionic monomer having a solubility parameter of  $20.5 \text{ (MPa)}^{1/2}$  or less,

1 to 80% by weight in total of the anionic monomer or the cationic monomer, and

15 to 94% by weight of the nonionic unsaturated monomer having a solubility parameter of  $26.6 \text{ (MPa)}^{1/2}$  or more;

wherein the surfactant(B) is a water-soluble alcohol alkylene oxide adduct containing an alkylene oxide group having 2 to 4 carbons in an average amount of 5 to less than 150 moles per 1 mole of the alcohol; and

wherein the paper quality improver provides a paper quality improving effect of a standard improved ratio in burst index of -502 or more.

15. (Canceled)

16. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein the content of the nonionic monomer having a solubility parameter of 20.5 or less in the monomer composition of the copolymer (A), is 15 to 60% by weight.

17. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein the content of the nonionic monomer having a solubility parameter of 20.5 or less in the monomer composition of the copolymer (A), is 20 to 50% by weight.

18. (Canceled)

19. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein the weight ratio of the copolymer (A) and surfactant (B) to the water-soluble polymer (C), which is  $[\text{copolymer (A)} + \text{surfactant (B)}]/[\text{water-soluble polymer (C)}]$ , is 98/2 to 20/80.

20. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein the copolymer (A) has a weight-average molecular weight of 10,000 to 2,000,000, as determined when using polyethylene glycol as a standard sample in GPC (gel permeation chromatography).

21. (Canceled)

22. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein the mixture of the copolymer (A) and the surfactant (B) is water-soluble.

23. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein said at least one nonionic unsaturated monomer having a solubility parameter of 26.6 (MPa)<sup>1/2</sup> or more is acrylamide.

24. (Previously Presented) A process of producing a pulp sheet according to claim 1, wherein said nonionic monomer having a solubility parameter of 20.5 (MPa)<sup>1/2</sup> or less is a monomer selected from the group consisting of alkyl (meth) acrylic acid of 1 to 40 carbons, vinyl alcohol of 1 to 40 carbons, alkyl-modified (meth) acrylamides of 2 to 40 carbons, alkoxy-

modified (meth) acrylamides of 2 to 40 carbons, mono-alkyl esters of maleic acid of 1 to 40 carbons, di-alkyl esters of maleic acid of 1 to 40 carbons, mono-alkyl esters of fumaric acid of 1 to 40 carbons; di-alkyl esters of fumaric acid of 1 to 40 carbons, styrene, vinyltoluene,  $\alpha$ -methylstyrene, ethylene, propylene, butadiene, polyalkylene glycol (meth) acrylates, alkoxy polyalkylene glycol (meth) acrylates, polyalkylene glycol alkenylethers and alkoxy polyalkylene glycol alkenylethers.

**25-27. (Canceled)**

**28. (Previously Presented)** A process of producing a pulp sheet according to claim 1, wherein said paper quality improver is blended with the pulp material in a refiner, machine chest or head box.

**29. (New)** A process of producing a pulp sheet according to claim 1,

wherein the cationic monomer constituting the copolymer (A) is an unsaturated monomer selected from the group consisting of dimethylaminoethyl(meta)acrylate, diethylaminoethyl (meta)acrylate, dimethylaminopropyl(meta)acrylamide, diethylaminopropyl(meta)acrylamide, allylamine, diallylamine, triallylamine, salts of said unsaturated monomer with an inorganic or organic acid and quaternary ammonium salts of said unsaturated monomer obtained in a reaction with a quaternarizing agent;

wherein the inorganic or organic acid is hydrochloric acid, sulfuric acid, acetic acid or



phosphoric acid;

wherein the quaternarizing agent is methyl halide, ethyl halide, benzyl halide, dialkyl sulfate, dialkyl carbonate, or epichlorohydrin.

30. (New) A process of producing a pulp sheet according to claim 1,

wherein the anionic monomer constituting the copolymer (A) is an unsaturated monomer selected from the group consisting of a monocarboxylic acid, a dicarboxylic acid, an organic sulfonic acid and salts thereof;

wherein the monocarboxylic acid is (meta)acrylic acid or crotonic acid;

the dicarboxylic acid is maleic acid, fumaric acid, itaconic acid, muconic acid or the half esters thereof;

the organic sulfonic acid is vinylsulfonic acid, styrenesulfonic acid or 2-acrylamide-2-methylpropanesulfonic acid; and

the salt is a sodium salt, potassium salt or ammonium salt.